What is claimed is:

1. A hard coating film excellent in adhesion to be formed on a substrate, comprising stacked layers including at least the following layers (1) to (3):

(1) a first layer on the substrate side comprising one or more metals selected from the group consisting of elements in Groups 4A, 5A, and 6A of the periodic table;

(2) a B- and C-containing surface layer; and

(3) a graded composition layer which is formed in a sandwiched manner between the first layer and the surface layer, and has a thickness of 0.05 μm or more, and in which the content of B and C changes continuously or stepwise from the first layer side toward the surface layer side.

2. The hard coating film according to claim 1, wherein at least one of layers of a nitride and a carbonitride of one or more metals selected from the group consisting of elements in Groups 4A, 5A, and 6A of the periodic table is further interposed between the first layer and the graded composition layer.

3. The hard coating film according to claim 1, wherein a bond between one or more elements selected from the group consisting of elements in Groups 4A, 5A, and 6A of the periodic table, and at least any of B, C, and N is contained in the graded composition layer.

4. The hard coating film according to claim 1, wherein the ratio of C to B in the surface layer is 0.1 to 0.3 on a mole basis.

5. The hard coating film according to claim 1, wherein one or more elements selected from the group consisting of elements in Groups 4A, 5A, and 6A of the periodic table, Si, Al, and N are contained in a proportion of 0.02 to 0.5 mol in the surface layer.

6. A method for manufacturing a multilayer type hard coating film excellent in adhesion according to claim 1, comprising: arranging at least one target of one or more metals selected from the group consisting of elements in Groups 4A, 5A, and 6A of the periodic table, or an alloy thereof, and at least one B- and C-containing target in the same vacuum chamber, and thus applying a sputtering process while rotating the substrate, thereby to form the hard coating film on the substrate surface.

7. A hard coating film excellent in adhesion to be formed on a substrate, comprising stacked layers including at least the following layers (1) to (3):

(1) a first layer on the substrate side comprising a layer of a nitride and/or a carbonitride of one or more metals selected from the group consisting of elements in Groups 4A, 5A, and 6A of the periodic table;

(2) a B- and C-containing surface layer; and

(3) a graded composition layer which is formed in a sandwiched manner between the first layer and the surface layer, and has a thickness of 0.05 μm or more, and in which the content of B and C changes continuously or stepwise from the first layer side toward the surface layer side.

8. The hard coating film according to claim 7, wherein a bond between one or more elements selected from the group consisting of elements in Groups 4A, 5A, and 6A of the periodic table, and at least any of B, C, and N is contained in the graded composition layer.

9. The hard coating film according to claim 7, wherein the ratio of C to B in the surface layer is 0.1 to 0.3 on a mole basis.

10. The hard coating film according to claim 7, wherein one or more elements selected from the group consisting of elements in Groups 4A, 5A, and 6A of the periodic table, Si, Al, and N are contained in a proportion of 0.02 to 0.5 mol in the surface layer.

11. A method for manufacturing a multilayer type hard coating film excellent in adhesion according to claim 7, comprising: arranging at least one target of one or more metals selected from the group consisting of elements in Groups 4A, 5A, and 6A of the periodic table, or an alloy thereof, and at

least one B- and C-containing target in the same vacuum chamber, and thus applying a sputtering process while rotating the substrate, thereby to form the hard coating film on the substrate surface.

12. A hard coating film excellent in adhesion, comprising: a cubic boron nitride film as an outermost surface layer: and a B- and N-containing layer, the cubic boron nitride film being stacked in a state of having been nucleated from the B- and N-containing layer, and the B- and N-containing layer having a ratio of N to B of 0.8 to 1 on a mole basis at least in the nucleation portion, and containing one or more elements selected from the group consisting of elements in Groups 4A, 5A, and 6A, and Si in a proportion of 0.02 to 0.1 on a molar ratio basis.

13. The hard coating film according to claim 12, wherein a bond between one or more elements selected from the group consisting of elements in Groups 4A, 5A, and 6A of the periodic table, and Si, and at least any of B and N is contained in the B- and N-containing layer.

14. The hard coating film according to claim 12, containing C in a proportion of 0.2 or less on a mole basis in at least the nucleation portion.

15. The hard coating film according to claim 12, to be formed on a B- and C-containing film formed on the substrate

side.

16. The hard coating film excellent in adhesion according to claim 15, wherein the B- and C-containing film provided on the substrate side comprises stacked layers including at least the following layers (1) to (3):

(1) a first layer on the substrate side comprising one or more metals selected from the group consisting of elements in Groups 4A, 5A, and 6A of the periodic table;

(2) a B- and C-containing surface layer; and

(3) a graded composition layer which is formed in a sandwiched manner between the first layer and the surface layer, and has a thickness of 0.05 μm or more, and in which the content of B and C changes continuously or stepwise from the first layer side toward the surface layer side.

17. The hard coating film excellent in adhesion according to claim 15, wherein the B- and C-containing film provided on the substrate side comprises stacked layers including at least the following layers (1) to (3):

(1) a first layer on the substrate side comprising a layer of a nitride and/or a carbonitride of one or more metals selected from the group consisting of elements in Groups 4A, 5A, and 6A of the periodic table;

(2) a B- and C-containing surface layer; and

(3) a graded composition layer which is formed in a

sandwiched manner between the first layer and the surface layer, and has a thickness of 0.05 μm or more, and in which the content of B and C changes continuously or stepwise from the first layer side toward the surface layer side.

18. A method for manufacturing a multilayer type hard coating film excellent in adhesion according to claim 12, comprising: arranging at least one target of one or more metals selected from the group consisting of elements in Groups 4A, 5A, and 6A of the periodic table, and Si or an alloy thereof, and at least one B- and C-containing target in the same vacuum chamber, and thus applying a sputtering process, thereby to form the hard coating film on the substrate surface.